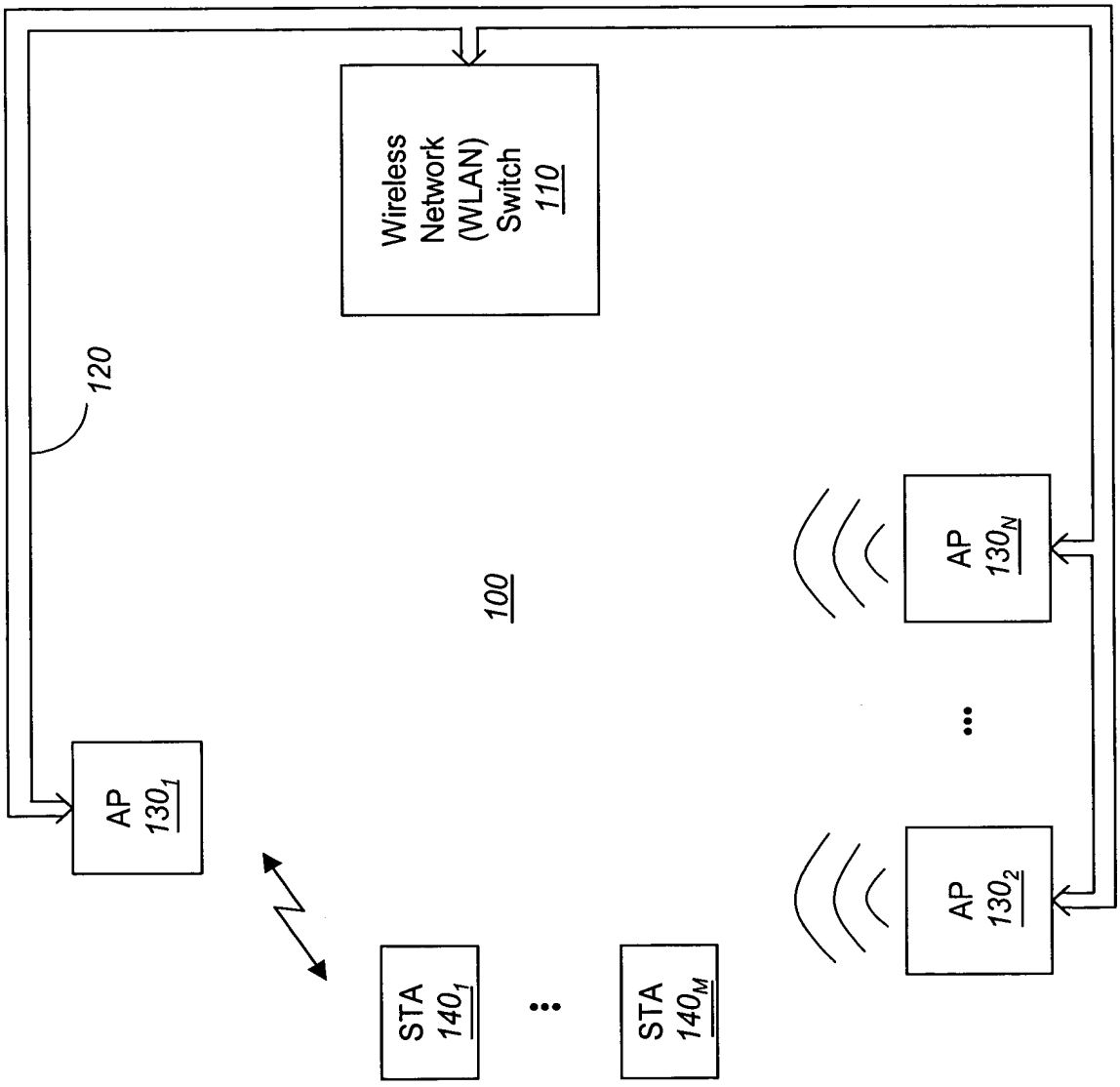

Wireless Network (WLAN) Switch 110
120
100
AP 130$_1$
AP 130$_2$
AP 130$_N$
STA 140$_1$
STA 140$_M$

Figure 1

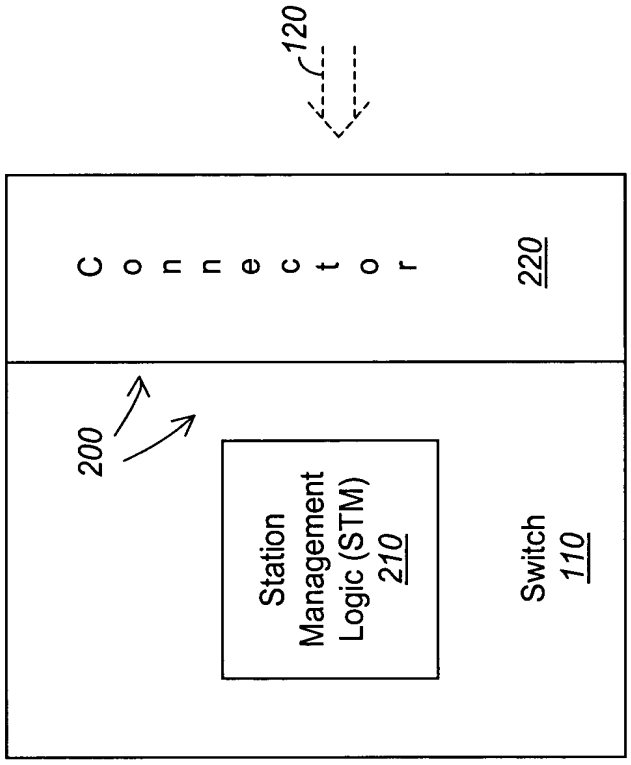

120
Connector
220
200
Station Management Logic (STM) 210
Switch 110

Figure 2

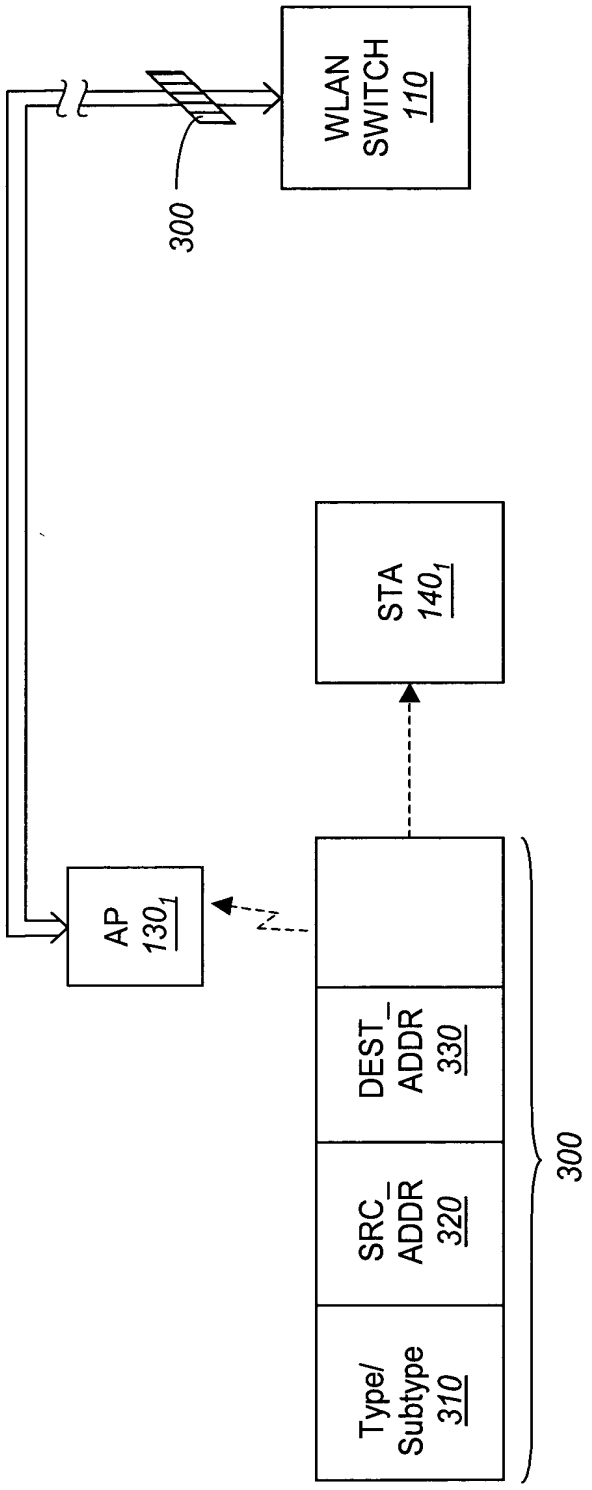


Figure 3A

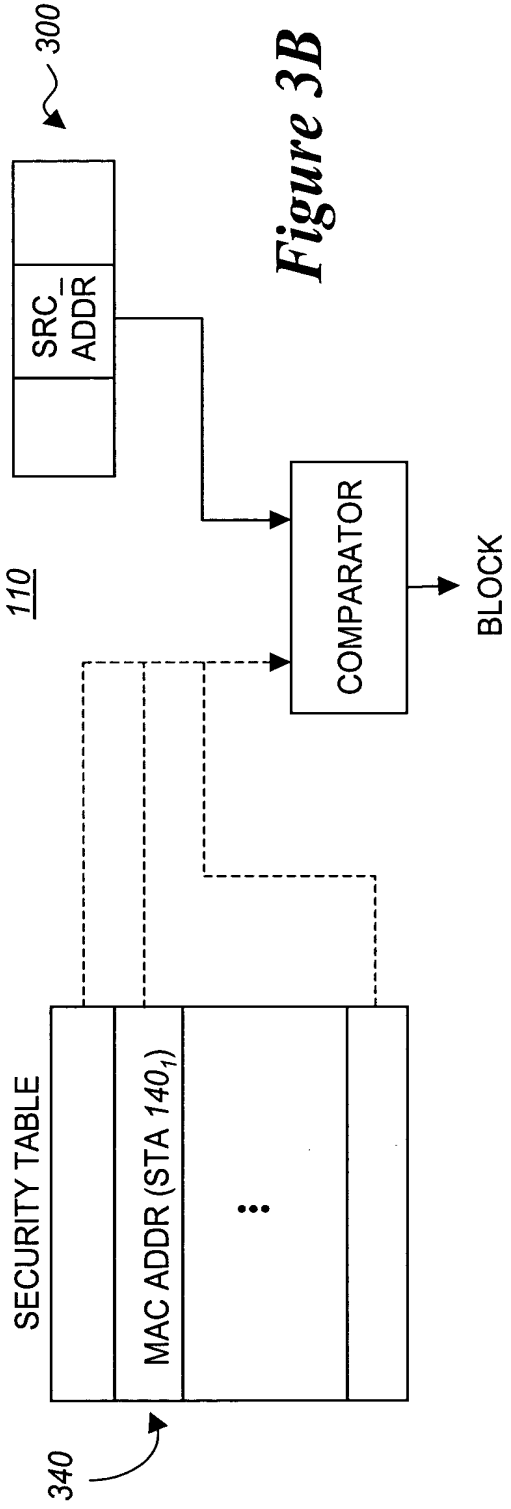


Figure 3B

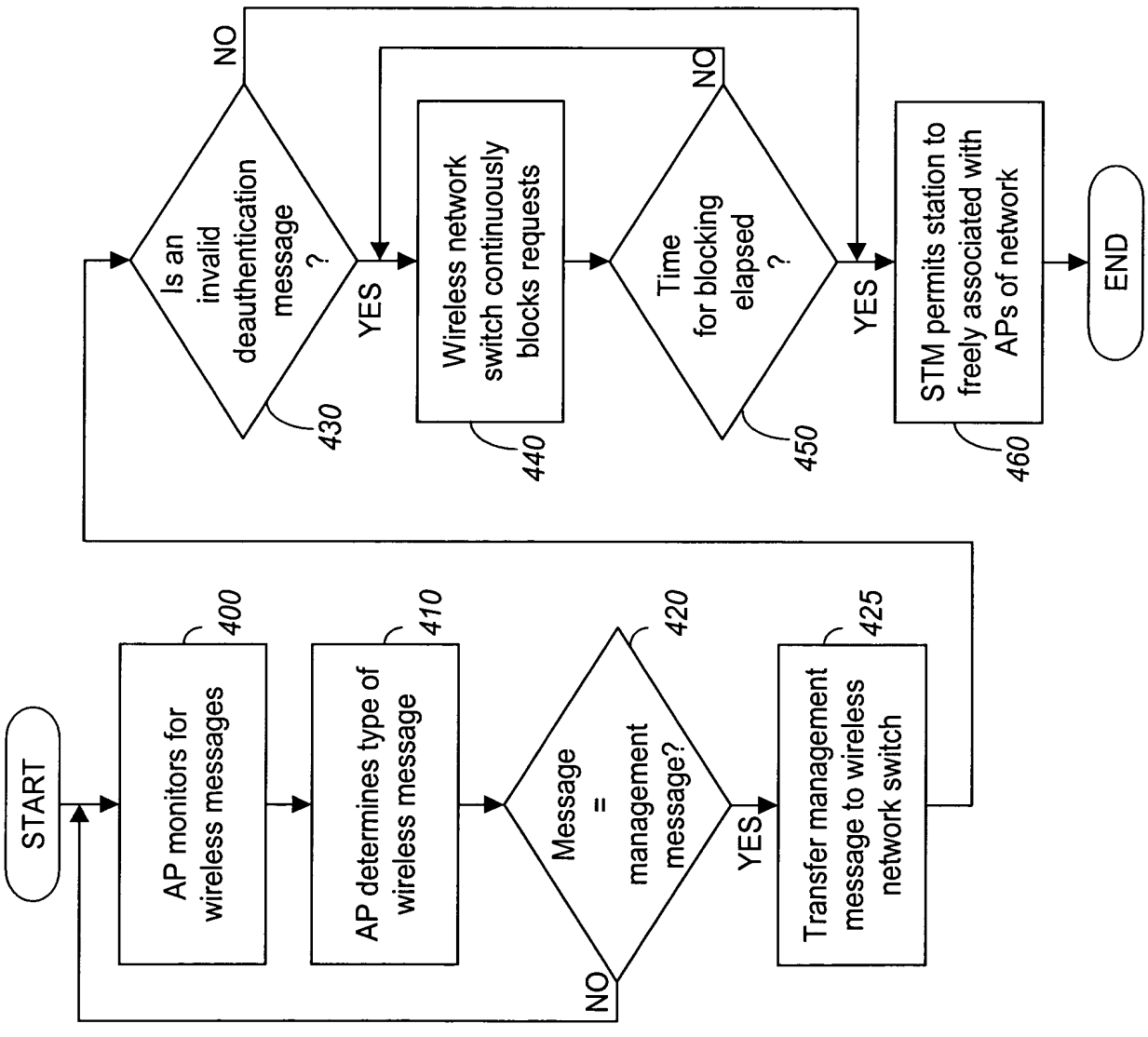
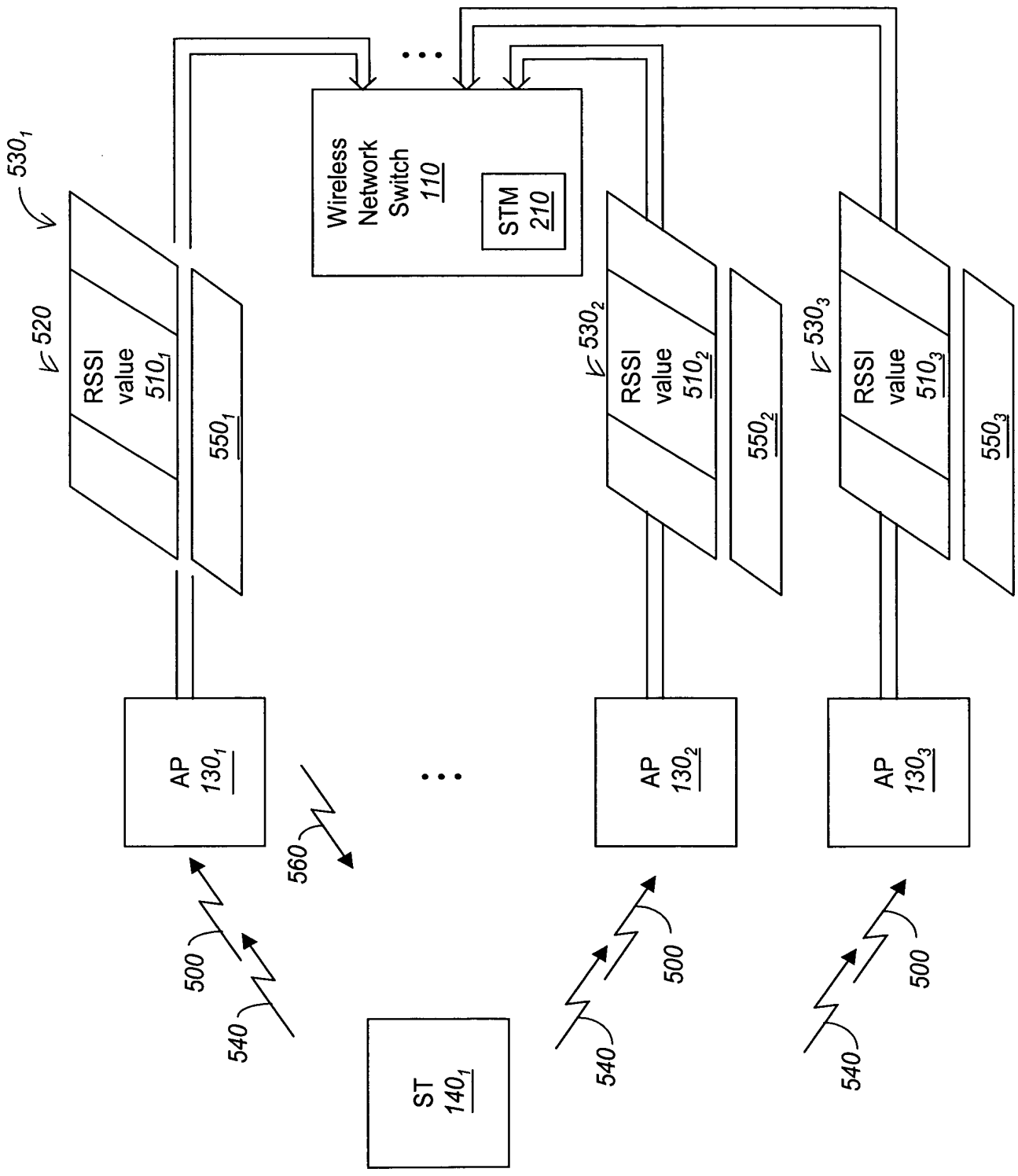

START
AP monitors for wireless messages
400
AP determines type of wireless message
410
Message = management message?
420
NO
YES
Transfer management message to wireless network switch
425
Is an invalid deauthentication message ?
430
NO
YES
Wireless network switch continuously blocks requests
440
Time for blocking elapsed ?
450
NO
YES
STM permits station to freely associated with APs of network
460
END

Figure 4

Figure 5


Wireless Network Switch 110
STM 210
530_1
520
RSSI value 510_1
550_1
530_2
RSSI value 510_2
550_2
530_3
RSSI value 510_3
550_3
AP 130_1
AP 130_2
AP 130_3
560
500
540
ST 140_1

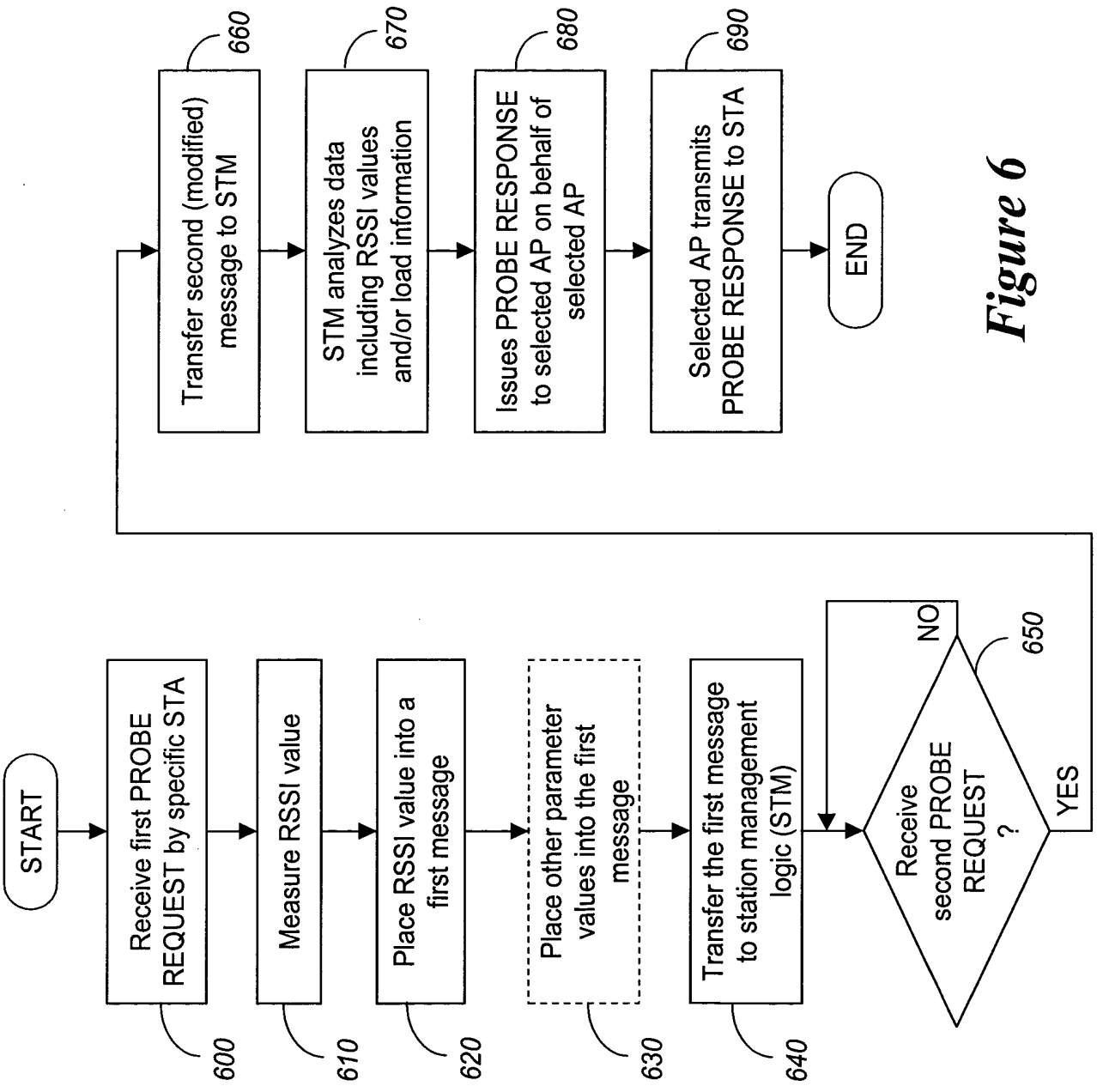

START
Receive first PROBE REQUEST by specific STA
600
Measure RSSI value
610
Place RSSI value into a first message
620
Place other parameter values into the first message
630
Transfer the first message to station management logic (STM)
640
Receive second PROBE REQUEST ?
650
NO
YES
Transfer second (modified) message to STM
660
STM analyzes data including RSSI values and/or load information
670
Issues PROBE RESPONSE to selected AP on behalf of selected AP
680
Selected AP transmits PROBE RESPONSE to STA
690
END

Figure 6

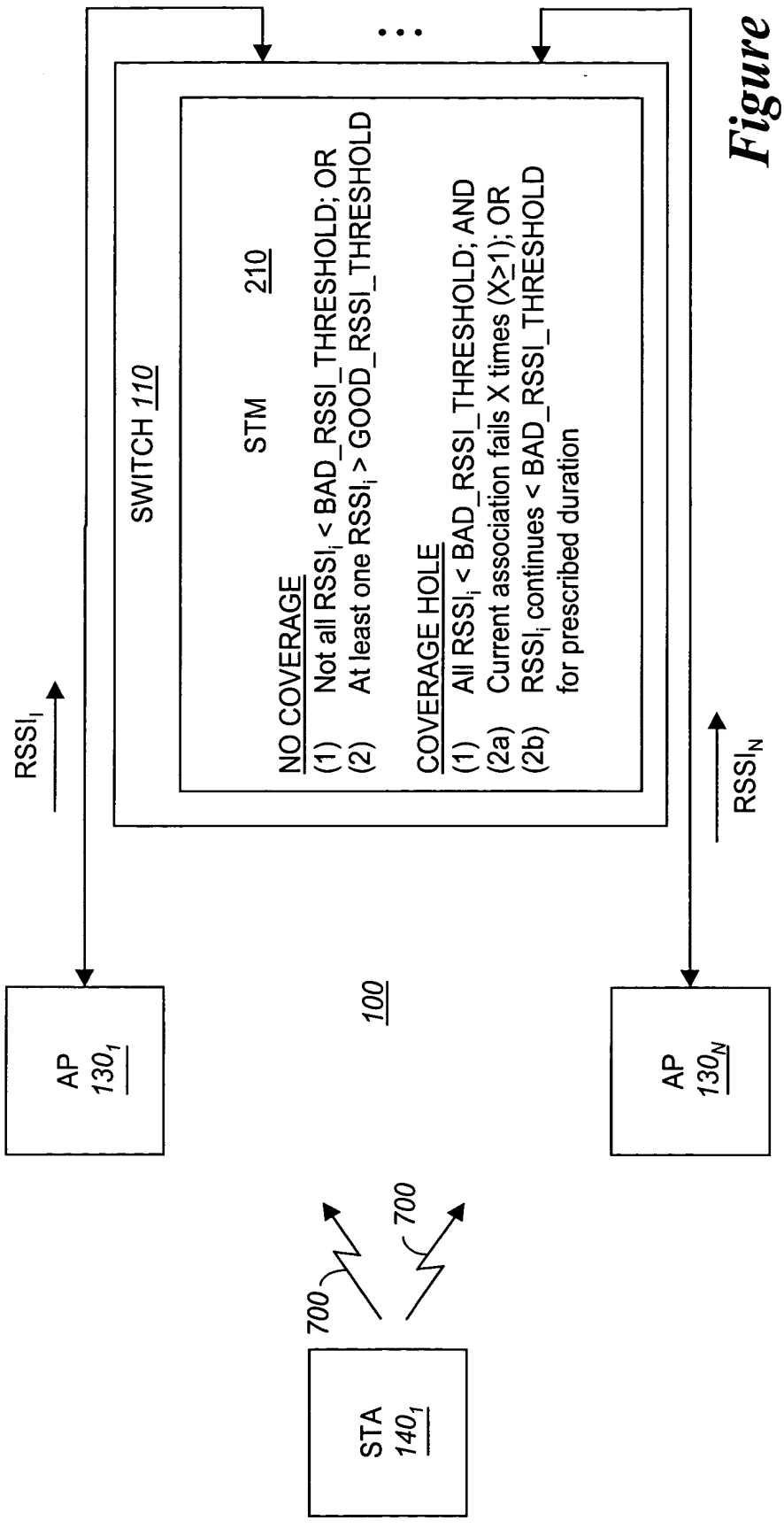

SWITCH 110
STM 210
NO COVERAGE
(1) Not all RSSI$_i$ < BAD_RSSI_THRESHOLD; OR
(2) At least one RSSI$_i$ > GOOD_RSSI_THRESHOLD
COVERAGE HOLE
(1) All RSSI$_i$ < BAD_RSSI_THRESHOLD; AND
(2a) Current association fails X times (X≥1); OR
(2b) RSSI$_i$ continues < BAD_RSSI_THRESHOLD for prescribed duration
RSSI$_1$
RSSI$_N$
AP 130$_1$
AP 130$_N$
100
700
700
STA 140$_1$

Figure 7

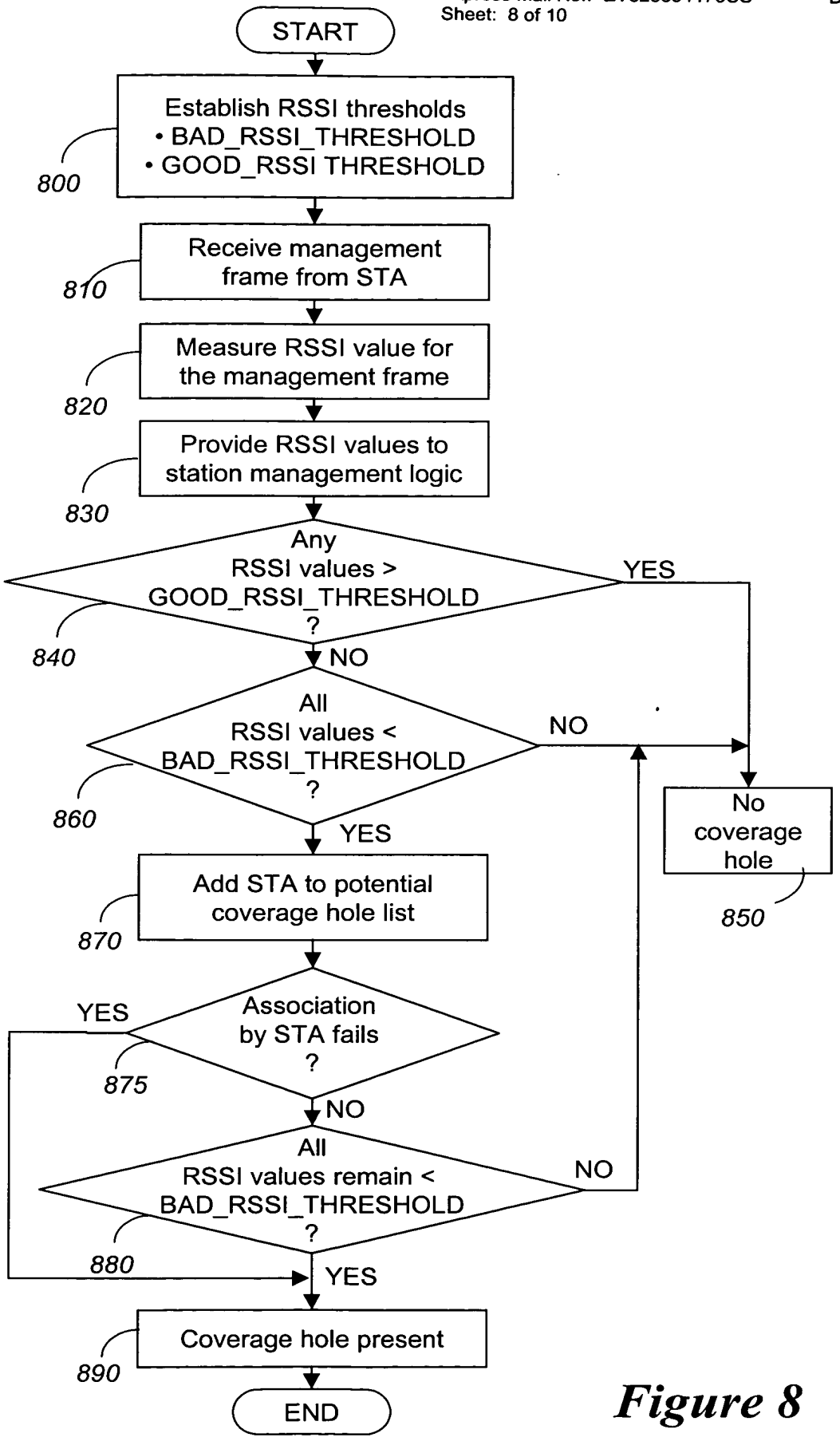

START
Establish RSSI thresholds
• BAD_RSSI_THRESHOLD
• GOOD_RSSI THRESHOLD
800
Receive management frame from STA
810
Measure RSSI value for the management frame
820
Provide RSSI values to station management logic
830
Any RSSI values > GOOD_RSSI_THRESHOLD ?
840
YES
NO
All RSSI values < BAD_RSSI_THRESHOLD ?
860
NO
YES
No coverage hole
850
Add STA to potential coverage hole list
870
Association by STA fails ?
875
YES
NO
All RSSI values remain < BAD_RSSI_THRESHOLD ?
880
NO
YES
Coverage hole present
890
END

Figure 8

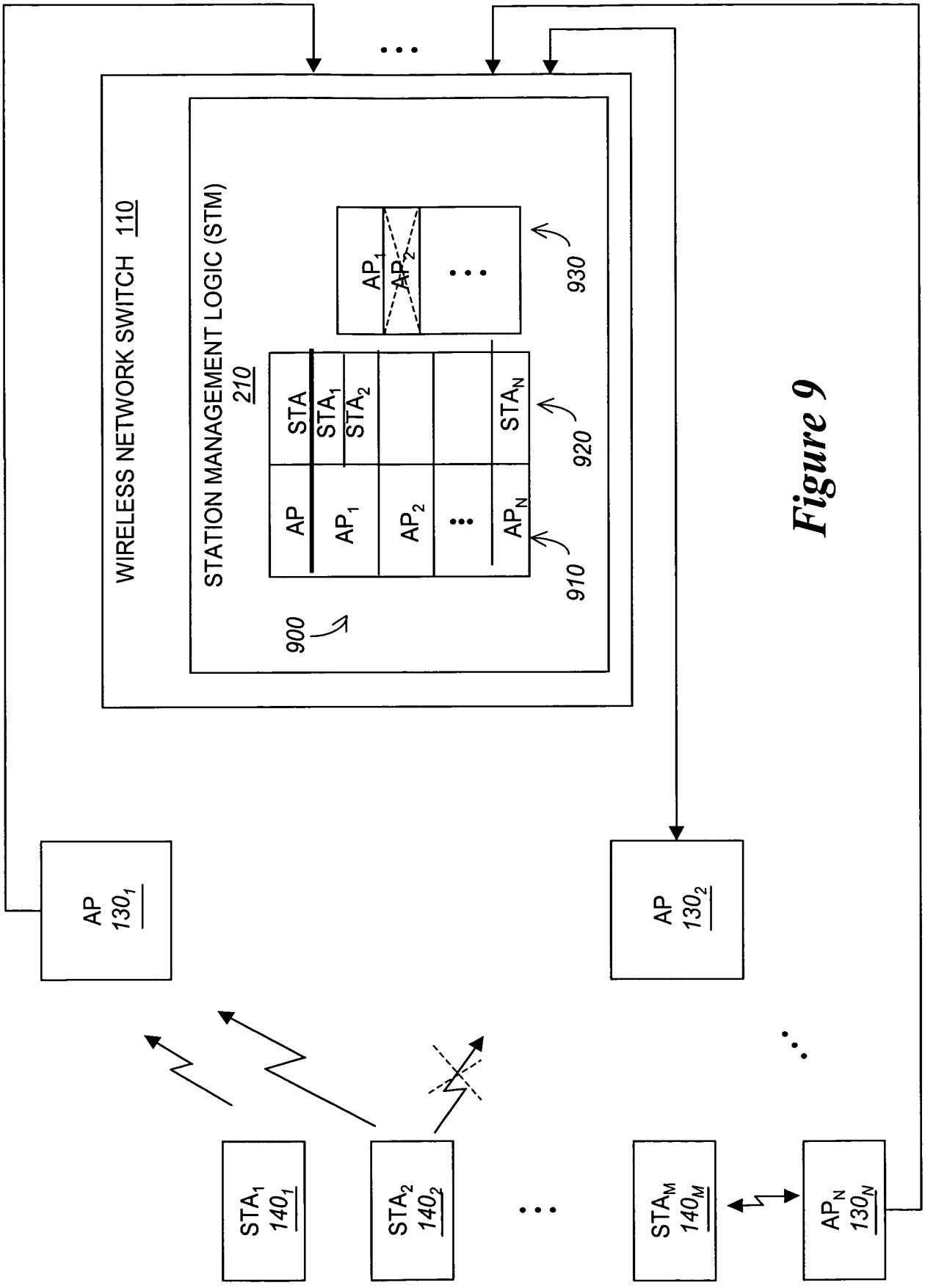

WIRELESS NETWORK SWITCH 110
STATION MANAGEMENT LOGIC (STM)
210
AP
STA
AP1
STA1
STA2
AP2
APN
STAN
900
910
920
930
AP1
AP2
AP 1301
AP 1302
STA1 1401
STA2 1402
STAM 140M
APN 130N

Figure 9

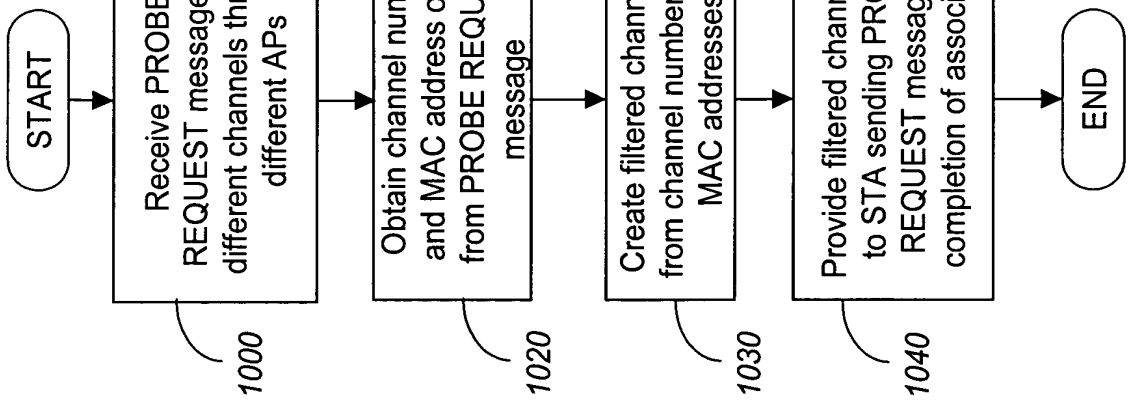

START
Receive PROBE REQUEST messages on different channels through different APs
1000
Obtain channel number and MAC address of AP from PROBE REQUEST message
1020
Create filtered channel list from channel numbers and MAC addresses
1030
Provide filtered channel list to STA sending PROBE REQUEST message at completion of association
1040
1010
END

Figure 10